

The Human Nutraceutical Research Unit (HNRU)

Advancing Foods & Natural Health Products for
Health through Human Research

Amanda J. Wright, Ph.D.

HNRU Director
Associate Professor



HUMAN HEALTH
and
Nutritional Sciences

UNIVERSITY
of
GUELPH





About the HNRU

- Research & educational unit in the Department of Human Health & Nutritional Sciences
- Mission: To provide learning and research opportunities through collaborations with food & natural health product (FF-NHP) industry and health professionals
- Core emphasis on human clinical trials of FF-NHP
 - Design and execution
 - Contract research for external partners
- Centrally located with proximity to the Department of Food Science & the Guelph Food Technology Centre

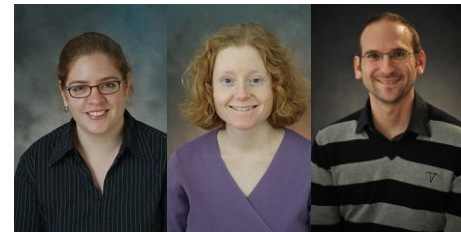


The HNRU Team

- Department of Human Health & Nutritional Sciences

- Faculty Management Committee

- Prof. Amanda Wright, Director
- Prof. Alison Duncan, Associate Director - Research
- Prof. David Mutch, Associate Director – Biomarker Discovery



- Clinical Trials Manager

- Hilary Tulk, M.Sc.



- Medical Technicians

- Graduate Student Associates





What the HNRU Offers

- Access to University of Guelph expertise & infrastructure
- Leadership & experience in FF-NHP human research
- Track record of successful interdisciplinary collaborations
- Human testing for a wide range of products & endpoints
- Well designed studies tailored to meet client needs
- Access to a wide range of study participants
- Studies of exercise performance & enhancement



Examples of Studies

Investigational Products

- Foods & Natural Health Products
- Examples: Probiotics, prebiotics, yogurt, antioxidants, soy, pulses, fish oils, shortenings, oats, fibres, mint tea

Types of Studies

- Bioavailability, acute or chronic intervention
- Randomized, double-blind placebo controlled
- Crossover, parallel arm
- Diet-controlled
- Exercise

Types of samples & measurements

- Blood, urine, feces, muscle, adipose tissue, breast milk, synovial fluid
- Anthropometrics, blood pressure, body composition
- Validated self-reported or physician symptom scoring
- Food intake & nutrient analysis, physical performance

Conditions

- Diabetes, cardiovascular disease, arthritis, GI health, immune modulation, weight loss

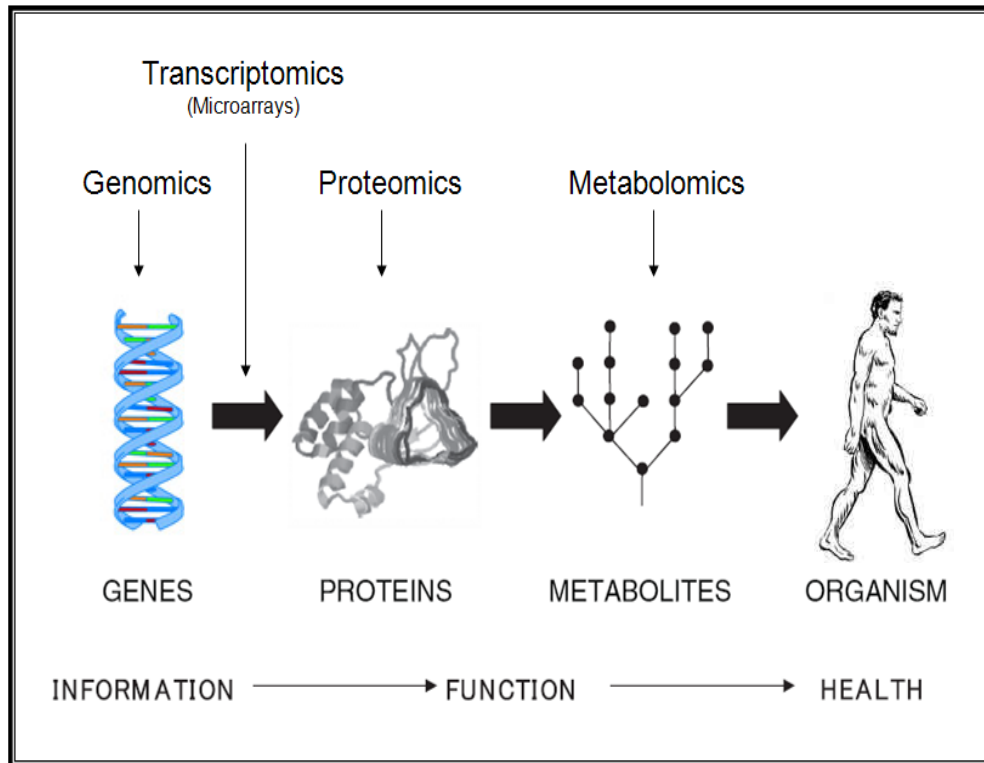


Biomarkers

- As per condition, in-house or through accredited laboratories
- Examples: blood lipids, glucose, insulin, lactate, homocysteine, markers of inflammation or oxidation ...

The Nutrigenomics Approach

Diet-Gene Interactions

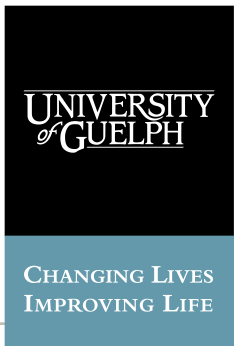
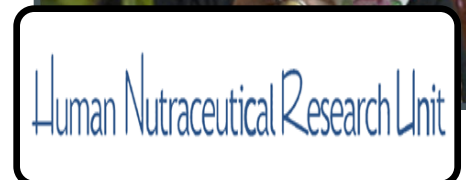


- Emerging dimension to enhance/extend food & nutrition research
- Personalized nutrition
- Improve study design & quality – homogeneity, target at risk individuals
- Biomarker discovery
- Advanced analytics

Selectively bred spearmint clone high in rosmarinic acid (RA)

High-RA spearmint reduces joint inflammation in horses

Human study to test high-RA tea in patients with arthritis inflammation



Growers

Tea Company

Rheumatologist & MD

Biochemistry

HQP

Arthritis Sufferers

OMAFRA

Res. Inst. for Aging

Low viscosity soluble fibres in dairy products – Type 2 diabetes risk

Flaxseed gum & soy soluble polysaccharides contribute low viscosities at high concentrations.

Purpose: To investigate the effects of fibre concentration & viscosity on postprandial glucose & insulin.

Highlights

- Thorough characterization of product rheology.
- Determination of glycemic index & insuliemic index.
- Achieved high fibre concentrations without affecting product quality.
- The GI for all dairy products was lower than the control.
- Soy fibre, but especially flaxseed gum, altered the glycemic response.



Collaborators: Dr. Goff

“Project Shortening”

Collaborators: Drs. Marangoni & Seetharaman



Coasun is a structured emulsion containing 40 % less fat, low in saturated fatty acids and *trans* fatty acid free.

Purpose: To investigate the effects of a structured emulsion on postprandial CVD and type 2 diabetes disease risk (triglycerides, glucose & insulin) with consumption of cakes & cookies in 19 healthy adult males.

High & low moisture products matched for fat with the structured emulsion versus emulsion ingredients.

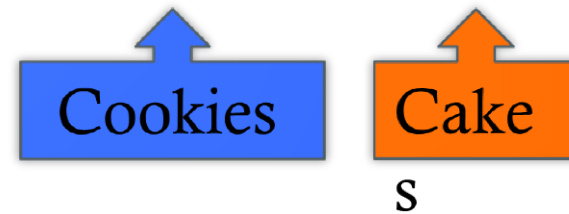
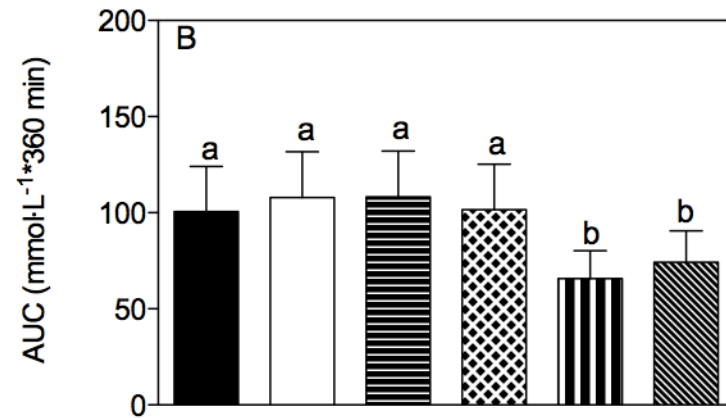
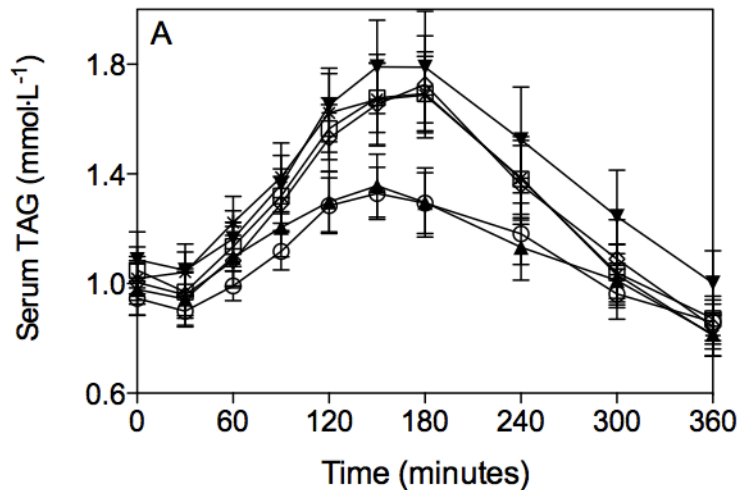
Cake & Cookie Composition:

	Weight (g)	Moisture (%)	Fat (g)	Total Carbohydrate (g)
Cookie	157.6 ± 1.0	1.7 ± 1.0	40.4	97.9
Cake	158.7 ± 1.7	41.9 ± 2.9	40.2	47.8

Cookies vs. Cakes



Postprandial Triglyceride (TAG) Response



Sugar Cookie Comparison

- Structured Emulsion vs. Interesterified Soy Shortening
- Key points about composition
 - ~ 120 g available carbohydrates per serving
 - Emulsion-based cookies : 41 g canola oil
 - Shortening-based cookies: 63 g highly saturated soy
- Results:
 - Comparable sugar cookies were prepared.
 - No differences in postprandial TAG, glucose or insulin.
 - Cookies with the emulsion contained 40% less fat and a more desirable fatty acid profile for chronic disease risk.



Recent Cereal-Related Publications

- The effect of **whole grain wheat sourdough bread** consumption on **serum lipids** ... depends on presence of the **APOE E3/E3 genotype**. NUTR & MET, 2010. 7: 37. TUCKER ET AL.
- Physicochemical properties of **oat β -glucan** influence its ability to reduce serum **LDL cholesterol** in humans. AJCN, 2010. 92: 723. WOLEVER ET AL.
- The acute impact of ingestion of **bread**s of varying composition on blood **glucose, insulin and incretins** following **first and second meals**. BJN, 2009. 101:391. NAJJAR ET AL.



The HNRU & Education

- The HNRU supports specialized training
 - FF-NHP development projects
 - M.Sc. degree project students
 - Volunteer opportunities
 - Internships for clinical studies programs
 - Undergraduate class clinical trial



M. Schwalbe, Courtesy of Marslanding

- University of Guelph food & nutritional sciences graduates are uniquely positioned to meet the demands of industry, government & academia.

The Human Nutraceutical Research Unit (HNRU)

Advancing Foods & Natural Health Products for Health Through Human Research



HUMAN HEALTH
and
Nutritional Sciences

UNIVERSITY
of
GUELPH

